

result of any given exploration, should it be successful in recovering skeletons. We are no longer bold enough to restore an entirely unknown extinct animal from a single bone or tooth, like the trustful Cuvierian school; but there are many kinds of bones and teeth of which we can determine the approximate geological age and probable associates, even if we have no exact knowledge of the animals to which they belong. A subject which began by providing material for wonder-books has thus been reduced to a science sufficiently precise to be of fundamental importance both to zoology and to geology; and its exactitude must necessarily increase with greater and greater rapidity as our systematic researches are more clearly guided by the experience we have already gained.

NOTES.

THE special report agreed upon by the Select Committee on the Daylight Saving Bill contains the following conclusion:—"Having regard to the great diversity of opinion existing upon the proposals of the Bill and to the grave doubts which have been expressed as to whether the objects of the measure can be attained by legislation without giving rise, in cases involving important interests, to serious inconvenience, your committee recommend that the Bill be not further proceeded with." We are glad the committee has arrived at this conclusion, which embodies the views expressed in these columns on several occasions. Most people are in favour of the principle of making the best and fullest use of daylight hours, but the compulsory alteration of the system of time-reckoning for several months of the year is quite a different matter. As we have pointed out, in engineering, building, agricultural and other industries in which it is difficult to carry on work by artificial light, the hours of labour are already adapted to the daylight hours in different seasons. Here we have the voluntary adoption of the principle of daylight saving, and we are in complete sympathy with any movement to encourage the extension of the custom to other industrial or commercial circles where earlier hours of commencing work during certain months are practicable or desirable. This can be accomplished, however, without legislation, and the committee has acted wisely in recommending that the Bill, which would make a seasonal change of time compulsory, be not carried further.

A BILL to promote the economic development of the United Kingdom and the improvement of the roads therein was introduced in the House of Commons on August 26 by the Chancellor of the Exchequer. In the explanatory memorandum of this Bill it is stated that Part i. enables the Treasury to make free grants and loans for the purpose of aiding and developing forestry, agriculture, and rural industries, the reclamation and drainage of land, the improvement of rural transport (other than roads), the construction and improvement of harbours and canals, and the development and improvement of fisheries, and for any other purpose calculated to promote the economic development of the United Kingdom. A grant or loan must be made either to or through a Government department, and all applications for grants or loans have to be referred to an advisory committee, and the recommendations of the committee considered before the grant or loan is made; but the responsibility of making the grant or loan will rest with the Treasury, who will not be bound by the recommendations of the committee. All grants and loans will be made out of a separate fund, which will be fed by (1) sums annually voted by Parliament; (2) a sum of 2,500,000*l.* charged on the Consolidated Fund and payable in five annual instalments of 500,000*l.* each in 1911, 1912, 1913, 1914, and 1915; (3) sums received by way of interest on

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and repayment of loans and the profits made as the result of a grant or loan in cases where the repayment of such profits is made a condition of the grant or loan. Power is given to the Board of Agriculture and Fisheries and the Department of Agriculture and Technical Instruction for Ireland to acquire land (compulsorily if necessary) for any purpose for which a grant is made to them. As the *Times* points out, this part of the Bill will permit the expenditure of money on scientific research and experimental work of a kind likely to be beneficial to agriculture. Part ii. of the Bill constitutes a Road Board for the purpose of improving the facilities for motor traffic. In addition to the power of acquiring land for the purposes of new roads proposed to be constructed by the Road Board, the Board is given power to acquire land in rural districts on either side of any such proposed road to the extent of 220 yards in depth.

DR. ALEXANDER RUSSELL has been appointed principal of Faraday House in succession to the late Mr. H. E. Harrison.

DR. T. H. BRYCE, lecturer on anatomy at Queen Margaret College, Glasgow, has been appointed Regius professor of anatomy in the University of Glasgow in succession to Prof. J. Cleland.

WE regret to see the announcement of the death, at sixty-seven years of age, of Prof. E. C. Hansen, head of the physiological department of the Carlsberg Laboratory, Copenhagen, for studies of chemistry and plant physiology, with particular reference to fermentation.

THE death is announced, at sixty-four years of age, of Dr. Radcliffe Crocker, distinguished particularly by his work on diseases of the skin. Dr. Crocker was the first president of the dermatological section of the Royal Society of Medicine, and made many valuable contributions to the literature of dermatology, among them being his "Treatise on Diseases of the Skin" and "Atlas of Diseases of the Skin."

THE twentieth annual general meeting of the Institution of Mining Engineers will be held at Newcastle-upon-Tyne on September 15. The following are among the papers to be read or discussed:—fire-damp caps and the detection of fire-damp in mines by means of safety-lamps, E. B. Whalley and W. M. Tweedie; equipment for the study of flame-caps and for miscellaneous experiments on safety-lamps, Prof. G. R. Thompson; electricity in coal mines, R. Nelson.

THE Budapest correspondent of the *Times* reports that the sixteenth International Congress of Medicine was officially opened there on August 29 by the Archduke Joseph in the name of the King of Hungary and Emperor of Austria. More than 4300 members have enrolled their names in the list, and they include a large number of eminent authorities on medicine from all parts of the world. We hope to give, in a future issue, an account of subjects of wide scientific interest and importance brought before the congress.

THE next International Congress of Mining, Metallurgy, Applied Mechanics, and Practical Geology will be held at Düsseldorf during the last week of June, 1910, under the auspices of the Rhenish-Westphalian Mining Industry. An influential committee of organisation has been formed which is charged with the making of the arrangements for the reading and discussion of papers, visits to places of technical interest, and social entertainments. Further information can be obtained in due course on application to the secretary of the Iron and Steel Institute or to the committee of organisation, Jacobistrasse, 3-5, Düsseldorf.

ON August 28 a West Indian hurricane struck the coast of north-eastern Mexico, and thence travelled inland over the States of Tamaulipas and Nuevo Leon. According to a *Times* correspondent, a deluge of rain fell for ninety-six hours, registering in all $17\frac{1}{2}$ inches, and the rivers, overflowing their banks, inundated territory estimated at 300 miles by 400 miles in area. Monterey, the capital town of Nuevo Leon, appears to have suffered most. The overflowing river swept through the lower parts of the town as a torrent half a mile, destroying life and property in its course.

IN accordance with previous announcements, arrangements have been made to hold the autumn meeting of the Iron and Steel Institute in London on September 27-30 and October 1. The programme includes the following papers:—the determination of the power consumption of reversing rolling-mills, C. A. Ablett; comparative tests of cast iron, E. Adamson; artificial magnetic oxide of iron, F. J. R. Carulla; action of air and steam on pure iron, Dr. J. Newton Friend; corrosion of iron, Dr. J. Newton Friend; uniform moisture in blast, Greville Jones; the refining of steel by electricity, Disponent E. J. Ljungberg; the fuel economy of dry blast, as indicated by calculations from empirical data, R. S. Moore; the "growth" of cast irons after repeated heatings, Prof. H. F. Rugan and Dr. H. C. H. Carpenter; the maintenance and renewal of permanent way, R. Price-Williams; the constitution of carbon-tungsten steels, T. Swinden.

THE past summer, comprised by the three months June, July, and August, was of a generally unsettled character over the whole of the British Islands; rain was of very frequent occurrence, and the days were, as a rule, decidedly cool. At Greenwich there were in all forty-one days with the temperature above 70° , of which twenty occurred in August, and there were six days with the thermometer above 80° , all of which occurred in August. Of recent years, 1903 and 1907 are the only summers as cold. The mean temperature for the whole period of three months was rather more than 2° below the average; the mean for the respective months was 55° in June, 61° in July, and 63° in August. The aggregate rainfall for the three months was 8.65 inches, of which 3.69 inches fell in June, 3.16 inches in July, and 1.80 inches in August; the total for the summer was 1.87 inches more than the average. Rain fell on forty-eight days, of which eighteen occurred in June, nineteen in July, and eleven in August. The total duration of sunshine was 502 hours, of which 106 occurred in June, 179 in July, and 217 in August. The deficiency of sunshine at Greenwich for the three months was 141 hours.

THE council of the National Museum of Wales is prepared to receive designs for a new museum at Cardiff, at a cost for the completed building of 250,000*l.*, inclusive of carving, but exclusive of decorative sculpture. A copy of a detailed statement of conditions and instructions to competing architects has reached us from Dr. W. E. Hoyle, director of the museum, and the prospect it presents is very pleasing. The museum is to afford the accommodation known to be necessary in all the various departments of a national museum, and will include the following exhibition galleries:—history and antiquities; geology and mineralogy; Welsh natural history; zoology and botany general; industries; art; children's room; aquarium. There will also be special rooms for study and reserve collections for each department. The circular of instructions states that the purpose of the building is to preserve and display articles of various kinds, not only with satisfaction to the connoisseur in each variety, but

with a taste and artistic refinement likely to waken the interest of the public generally. The exhibition cases will, as a rule, stand free in the rooms and not against the walls. Designs for the building must be sent in (carriage paid) addressed to the director, National Museum of Wales, City Hall, Cardiff, on or before January 31, 1910.

THE aviation week at Rheims ended on Saturday, August 28, when several remarkable flights and achievements were accomplished. The meeting has shown that aeroplanes of various designs are able to remain in the air for two or three hours, and to attain speeds of about fifty miles an hour. The Grand Prize for the longest flight was won by Mr. Farman, with a flight of nearly 112 miles in 3h. 4m. 56.4s.; the Gordon-Bennett Cup for speed by Mr. Curtiss, who flew the two-lap twenty-kilometre course in 15m. 50.6s.; the speed prize for swiftest flight over thirty kilometres by Mr. Curtiss, who did the distance in 26m. 40.2s.; the passenger prize by Mr. Farman, who flew six miles with two passengers in 10m. 39s.; and the altitude prize by Mr. Latham, for reaching the greatest height of 155 metres. The *Morning Post* of August 28 gives the following interesting table showing the successive stages of distances achieved in aeroplane flights since the commencement of public flights in Europe:—

Date	Aëroplane	Place	Time	Distance
Oct. 14, 1897	Ader	Satory ...	h. m. s.	Metres
Dec. 17, 1903	O. Wright...	Dayton ...	0 0 59	300
				260
				Kilom.
Dec. 17, 1904	O. Wright...	Dayton ...	—	4'5
Sept. 26, 1905	O. Wright...	Dayton ...	0 18 9	17'9
Sept. 29, 1905	O. Wright...	Dayton ...	0 19 55	19'5
Oct. 3, 1905	O. Wright...	Dayton ...	0 25 5	24'5
Oct. 4, 1905	O. Wright...	Dayton ...	0 33 17	33'4
Oct. 5, 1905	O. Wright...	Dayton ...	0 38 3	38'9
Sept. 14, 1906	S. Dumont...	Bagatelle ...	0 0 8	—
				Metres
Oct. 24, 1906	S. Dumont...	Bagatelle ...	0 0 8	50
Nov. 13, 1906	S. Dumont...	Bagatelle ...	0 0 8	60
Nov. 13, 1906	S. Dumont...	Bagatelle ...	0 0 8	82'60
Nov. 13, 1906	S. Dumont...	Bagatelle ...	0 0 21½	220
Oct. 15, 1907	H. Farman...	Issy ...	0 0 21	285
Oct. 26, 1907	H. Farman...	Issy ...	0 0 27	363
Oct. 26, 1907	H. Farman...	Issy ...	0 0 31½	403
Oct. 25, 1907	H. Farman...	Issy ...	0 0 52½	771
Nov. 9, 1907	H. Farman...	Issy ...	0 1 14	—
Jan. 11, 1908	H. Farman...	Issy ...	0 1 45	—
				Kilom.
Jan. 13, 1908	H. Farman...	Issy ...	0 1 28	1'5
Mar. 21, 1908	H. Farman...	Issy ...	0 3 31	2
April 10, 1908	Delagrange...	Issy ...	—	2'5
April 11, 1908	Delagrange...	Issy ...	0 6 30	3'9
May 27, 1908	Delagrange...	Rome ...	0 15 25	9
May 30, 1908	Delagrange...	Rome ...	0 15 26½	12'7
June 22, 1908	Delagrange...	Milan ...	0 16 30	17
July 6, 1908	H. Farman...	Issy ...	0 20 19½	19'7
Sept. 6, 1908	Delagrange...	Issy ...	0 29 53½	24'7
Sept. 9, 1908	O. Wright...	Fort Myer...	0 57 31	—
Sept. 9, 1908	O. Wright...	Fort Myer...	1 3 15	—
Sept. 10, 1908	O. Wright...	Fort Myer...	1 5 52	—
Sept. 11, 1908	O. Wright...	Fort Myer...	1 10 50	—
Sept. 12, 1908	O. Wright...	Fort Myer...	1 15 20	—
Sept. 21, 1908	W. Wright...	Auvours ...	1 31 25½	66'6
Dec. 18, 1908	W. Wright...	Auvours ...	1 54 53½	99'8
Dec. 31, 1908	W. Wright...	Auvours ...	2 20 23½	124'7
Aug. 7, 1909	Sommer ...	Châlons ...	2 27 15	—
Aug. 25, 1909	Paulhan ...	Béthény ...	2 43 24½	133'6
Aug. 26, 1909	Latham ...	Béthény ...	2 17 21	154'6
Aug. 27, 1909	Farman ...	Béthény ...	3 4 56½	180

SEVERAL remarkable pictures illustrate Lieut. Shackleton's account of his Antarctic expedition which he commences in the September number of *Pearson's Magazine*. The article is an interesting narrative of the origin and early work of the expedition, and may be regarded as an earnest of the detailed account to be published this autumn. We notice a few of the noteworthy points. Pack ice was sighted about 1500 miles from Lyttelton, and the journey was then continued southwards along the 178th meridian west. After passing through hundreds of tabular icebergs by means of narrow lanes, the Ross Sea was

reached, and the *Nimrod* was taken along the edge of the Great Ice Barrier, the enormous cliff of ice towering high above the vessel's crow's nest. The pack ice barred the way to King Edward VII. Land, where it had been intended to winter, so the vessel steamed to McMurdo Sound, and winter quarters were established at a spot twenty miles north of the point at which the *Discovery* expedition wintered. The party which ascended Mount Erebus made valuable observations of the volcano. In the old crater, above the southern end of which rises the active cone, a number of curious mounds were seen which proved to be fumeroles. The steam from the fumeroles is converted into ice as soon as it reaches the surface of the snow plain, and the result is the production of ice mounds. The active crater of Erebus was found to be between 800 feet and 900 feet deep, with a maximum width of half a mile, and at the bottom were seen three well-like openings from which the steam is projected. The height of the volcano was found to be 13,350 feet, and immense moraines ascend the western slope to a height of fully 1000 feet above sea-level. As the adjacent sea is at least 300 fathoms deep, this indicates that when at its maximum development the ice sheet must have had a thickness of not less than 2800 feet.

In Publication No. 60 of the Hull Museum Mr. T. Sheppard figures a fine skull of *Bison priscus* recently obtained from gravel at Kelsey Hill, Yorks.

We have to acknowledge the receipt from Mr. B. B. Woodward of a copy of his presidential address to the Malacological Society upon the subject of Darwinism and malacology.

In the Proceedings of the Academy of Natural Sciences of Philadelphia for May Mr. J. P. Moore describes part of a collection of polychætaous annelids dredged in 1904 off southern California; a large number of new species are included in the collection.

In the Journal of the Royal Microscopical Society Messrs. Heron-Allen and Earland continue their account of the Foraminifera found in the sand at Selsey Bill, Sussex. These include, not only recent, but also many extinct forms from various geological horizons.

In No. 191 of the Proceedings of the American Philosophical Society are included addresses on Darwin and Darwinism delivered at a commemorative meeting held at Philadelphia on April 23. In the first of these Mr. Bryce, British Ambassador at Washington, gives interesting personal reminiscences of Darwin and of the reception accorded to the "Origin of Species" on its first appearance. Mr. G. L. Goodale and Mr. G. S. Fullerton follow on with addresses respectively devoted to the influence of Darwin on the natural and on the mental and moral sciences, while Mr. E. G. Conklin winds up with the world's debt to Darwin.

In February last Dr. N. Annandale obtained on the Orissa coast of India a number of small more or less nearly globular organisms in the tide-wash. When placed in water their shape changed from globular to conical, and indicated that they were evidently pelagic sea-anemones, although devoid of tentacles. The mouth is conspicuous, forming a relatively long, narrow slit expanded at one end, and the whole organism presents a milky appearance, which conceals the internal organs. Externally a vinous tinge, deepening into brown at the aboral pole (which is perforated by a pore) was noticeable. As these actinians, which are apparently adult, although no gonads are visible, evidently indicate a new generic and specific type, Dr. Annandale has described them under the name *Anactinia pelagica*.

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Investigator sicarius is the name proposed by Captain F. H. Stewart in vol. i., No. 4, of Memoirs of the Indian Museum for a new type of geophyrean worm of which specimens were obtained by the s.s. *Investigator* in the Gulf of Manaar and off the Arakan coast. This annelid is regarded as indicating, not only a new genus and species, but likewise a new order, which it is proposed to designate by the uncouth title of "Investigatoroidea." This order is defined as geophyreans with an anterior terminal mouth and posterior subterminal vent, and a nervous system composed of dorsal cerebral ganglia and two lateral nerve-cords. The replacement of the median ventral nerve-cord by a pair of ventro-lateral cords is not considered sufficient to bar the inclusion of the new organism in the Geophyrea.

CONSIDERABLE interest attaches to an article in the August number of the *American Naturalist*, by Prof. D. H. Campbell, on the new flora of Krakatau (Krakatoa). When the island was first visited by scientific men two months after the great eruption of 1883, the whole surface was buried under a layer of ashes and pumice averaging 90 feet in depth, and in some places reaching double this depth. A clean sweep of living organisms was thus made. Except phosphorus and nitrogen, the elements necessary for plant-life existed in the ashes. By 1886, when the island was visited by Dr. Treub from Java, a number of plants had already established themselves, slimy, blue-green algæ being of special importance in preparing the soil for higher plants. The plants in the interior were found to be quite different from those near the coast, and the preponderance of ferns was remarkable. Since 1897, when another visit was paid, the progress of the new flora has been rapid, this being especially noticeable in 1906 in the case of the forest trees, which make it evident that the island will ere long be as densely afforested as ever. Nitrogen-forming bacteria have played an important part in rendering the soil fitted for vegetation. As regards distributional agencies, there seems no doubt that the earliest plant-immigrants, such as bacteria, blue-green algæ, ferns, and mosses, were wind-borne, and the same is probably true of the first phanerogams, Compositæ, and grasses to reach the island. On the other hand, ocean-currents have probably been the chief agents in transporting seeds and fruits, those of the strand-plants being almost certainly water-borne.

An article on the American Forest Service contributed by Mr. T. S. Woolsey to the *Indian Forester* (June and July) for the information of foresters in British India will certainly interest readers who follow the development of scientific forestry. It is mentioned that the actual administration of national forests in America by trained foresters only dates back four years, and in that time opposition has been overcome and public opinion educated by the publications which have been liberally distributed. The general nature of arrangements for timber sales is described in detail, and the outlines for working plans on national forests are indicated. Research at the experiment stations is concerned with tree and stand studies, run-off and ground-water measurements, and meteorological observations.

In consequence of the observation that lumps of gum are occasionally exuded by the bromeliad, *Guzmania zahni*, an investigation of other plants belonging to the same family was undertaken by Mr. K. Boresch. It was then found that several allied plants, notably *Aechmea pinelliana*, showed the same phenomenon. The given passages are situated in the cortex of the stem; they

usually originate lysigenously and the adjoining parenchymatous cells frequently grow in like thyloses; although not definitely ascertained, it seems probable that the process is pathological. Incidentally, the author traced a meristematic zone which gives rise to a thickening of the stem, as in *Ruscus*. The paper appears in the *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften*, Vienna (vol. cxvii., part viii.).

THE first portion of a study of various morphological features in the Umbelliferae is contributed by Dr. K. Domin to the *Bulletin International* (1908), published by the Académie des Sciences de l'Empereur François Joseph I. Various interesting points are noted regarding the seedlings, e.g. the tubular shape of the cotyledon stalks in species of *Ferula*, the occurrence of so-called monocotyledonous embryos as in *Bunium*, and three cotyledons observed in various species of *Eryngium*. The formation of the tuber in such genera as *Smyrniun* and *Bunium* is traced to the hypocotyl, which also produces roots above the tuber. The most important statement refers to the stipules, which are stated to be universally present and free in all species of *Hydrocotyle*; *Schizaelema* and *Huanaca* possess adnate stipules, while species of *Bowlesia* show various modifications from an ochrea to lacinate appendages.

THE chief of the U.S. Meteorological Service decided to make some important changes in the scope and character of the *Monthly Weather Review*, beginning with July 1. The data are now grouped according to natural topographic districts; for this purpose the United States has been divided into twelve climatological districts conforming to its principal drainage areas, each being under the supervision of a selected division director. The Review is to be devoted almost exclusively to the publication and discussion of climatological, river, and forecast data; special articles of a scientific nature, but not strictly climatological, will be published in the Bulletin of the Mount Weather Observatory or in separate form. The editors (Messrs. Abbe and Abbe, jun.) will prepare, as hitherto, brief notes on the progress of meteorological science throughout the world, so that the Review may still mark the development of the science, without publishing extensively the details of meteorological papers.

WE have received a reprint of an article on "The Tides: their Causes and Representation," published by Mr. R. A. Harris in the June number of the *Popular Science Monthly*. The article is illustrated by useful charts showing the co-tidal lines in the different oceans.

A NEW rainfall map of the Balkan peninsula, compiled by Herr Franz Trzebitzky, appears in the August number of *Petermann's Mitteilungen*. The data are obtained from 380 stations, 95 in Croatia and Dalmatia, 93 in Bosnia and Herzegovina, 50 in Servia, 105 in Bulgaria, 1 in Montenegro, 12 in Turkey, and 24 in Greece. The averages are reduced to the period 1894-1905.

THE *Zeitschrift* of the Berlin Gesellschaft für Erdkunde (1909, p. 361) publishes a lecture delivered before the society by Prof. Hecker on the determination of the value of gravity and its application to the problem of the distribution of mass in the earth's crust. A general outline of modern methods is given, and a summary of the most important results obtained from observation.

THE *Mitteilungen* of the reenna Geographical Society (1908, p. 150) contains a very interesting and suggestive paper by Dr. Max Müller on the graphical solution of a number of problems in "astronomical" geography. Some ten important problems are fully discussed, and methods of solution with the help of rule and compasses alone

described. A final example shows how to determine the approximate latitude and longitude of a place, from two observations of the sun's altitude, using a large globe.

PROF. HAMMER, discussing a paper on the forty-ninth parallel by Dr. Klotz (*Journal of the Royal Astronomical Society of Canada*, 1908, p. 282), deals with the determination of the boundary line between Canada and the United States west of the Lake of the Woods in a note in *Petermann's Mitteilungen* (viii., p. 188). The extraordinary difficulties inherent in the accurate laying down of a parallel of latitude are dwelt upon with great emphasis.

THE director-general of the Egyptian Survey Department has issued a reprint of a technical lecture—one of a series of such lectures—by Mr. J. I. Craig, on map projections. The general principles of the subject are outlined, and examples given of projections employed for different kinds of maps. The construction of a network for a special purpose is illustrated in an extremely interesting manner by a "Mecca azimuthal" projection, which is designed to give the true bearing of Mecca from every point of the map. As the author remarks, "its usefulness in finding the direction of the *Qibla* is evident."

THE June number of the *National Geographic Magazine* contains an article by Mr. Charles E. Fay on "The World's Highest Altitudes and First Ascents," which is accompanied by some remarkably beautiful illustrations. Mr. Milnor Roberts describes the Mount Rainier National Park in an article entitled "A Wonderland of Glaciers and Snow," and an interesting table, compiled by Mr. N. H. Darton, gives the highest point in each of the States. Mr. Hugh M. Smith, deputy commissioner of the U.S. Bureau of Fisheries, contributes a graphic account of "Brittany, the Land of the Sardine."

THE *Journal de Physique* for August contains the address delivered by Prof. Paul Janet to the Société française de Physique in April, on the history and the present position of the question of the fundamental electrical units. After giving a brief history of the various commissions which have dealt with the subject, he gives in detail the decisions arrived at under the headings ohm, ampere, volt, and states to what extent these decisions have been adopted officially by the various Governments. He is of opinion that the action of many of these Governments in adopting particular numbers as official has been rather precipitate, and would prefer them to wait until the institution of an international electrical laboratory has permitted comparisons to be made between the electrical standards kept at the various national laboratories.

THE second of a series of papers dealing with the phenomena exhibited by electric arcs between metal electrodes appears in the *American Journal of Science* for August. It is by Messrs. W. G. Cady and G. W. Vinal, and treats of the oscillations which, under certain conditions, can be produced. If an electromotive force of several hundred volts is connected through a variable resistance to an air-gap having, say, a copper cathode and an anode of any conducting material, and an arc is started, on increasing the resistance until the current falls to about 0.4 ampere the arc begins to oscillate with a frequency which in general lies between 1000 and 50,000 per second, and finally, as the resistance in series is increased, becomes a glow discharge or is extinguished. The authors explain with the aid of the volt-ampere curve the conditions which control the production of these oscillations, and give a provisional theory which covers the phenomena observed up to the present time.

ENGINEERING units of measurement form the subject of a pamphlet which has just been produced by Mr. J. Ramsay, of the Glasgow and West of Scotland Technical College. The greater part of the thirty-six pages consists of definitions of the quantities and symbols which more commonly occur in engineering, and in each case the author gives both British and metrical units, together with the connection between them. Several useful tables are given at the end. The value of the pamphlet will be appreciated when it is remembered that students of engineering in this country are compelled to use both British and metrical systems of measurement, a condition which tends to produce much mental confusion and hinders progress. While most of the author's explanations are good, we do not think that his remarks on pp. 8 and 9 regarding weight, mass, and gravitational and dynamical units of force are sufficiently clear; but few writers have succeeded in producing absolutely convincing statements when they take, as the present author does, the British gravitation unit of force as the force with which the earth attracts a pound weight at the sea-level at Greenwich, and also a unit of mass of 32.2 lb. The publishers of the pamphlet are Messrs. John Smith and Son, Glasgow, and the price is 1s. net.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN SEPTEMBER:—

- Sept. 1. 16h. om. Mars in conjunction with Moon (Mars $1^{\circ} 4' S.$).
 2. 17h. om. Saturn in conjunction with Moon (Saturn $1^{\circ} 14' N.$).
 3. 9h. 2m. to 9h. 50m. Moon occults ξ Ceti (mag. 4.5).
 7. Maximum of Mira Ceti (mag. 3.3-8.5).
 10. Saturn. Major axis of outer ring = $45^{\circ} 31'$, Minor axis = $10^{\circ} 00'$.
 15. 12h. 5m. Minimum of Algol (β Persei).
 16. 22h. om. Mercury at greatest elongation ($26^{\circ} 34' E.$).
 18. 8h. 54m. Minimum of Algol (β Persei).
 23. 22h. om. Mars at opposition to the Sun.
 „ 15h. 3m. Uranus in conjunction with Moon (Uranus $2^{\circ} 35' N.$).
 „ 3h. 39m. to 4h. 53m. Moon occults σ Sagittarii (mag. 2.1).
 28. 15h. om. Mars in conjunction with Moon (Mars $0^{\circ} 9' N.$).
 30. oh. om. Saturn in conjunction with Moon (Saturn $1^{\circ} 8' N.$).

THE SOUTH POLAR SPOT ON MARS.—With regard to the recent observation by M. Jonckheere, Dr. Lohse records in No. 4348 of the *Astronomische Nachrichten* (p. 61) that he observed the bright patch which has detached itself from the polar snow-cap on August 8. The position of the spot, in areographical coordinates, was:—longitude, 304.5° ; latitude, -74.5° . A measure of the south polar spot gave a diameter of about 30° .

COMET 1909b (PERRINE, 1896 VII.).—The position of comet 1909b, according to the ephemeris given in No. 4348 of the *Astronomische Nachrichten*, on September 3 will be α (1910-0) = 1h. 12-m., $\delta = +46^{\circ} 24.8'$, whilst that on September 15 will be $\alpha = 2h.$ om., $\delta = +51^{\circ} 32.9'$. Thus we see the comet is passing from Andromeda to Perseus, and on September 9 will pass about half a degree north of ν Persei; at the same time it is approaching both the earth and the sun, and is now about one magnitude brighter than when re-discovered.

THE ORBITS OF CERTAIN SPECTROSCOPIC BINARIES.—Nos. 15 and 17, vol. i., of the Publications of the Allegheny Observatory deal, respectively, with the orbits of the spectroscopic binaries π^3 Orionis and ζ^1 Lyræ. The former is discussed by Mr. R. H. Baker on the basis of thirty-six spectrograms obtained with the single-prism Mellon spectrograph. The orbit is nearly circular, the eccentricity,

in the final elements, being given as 0.027 ± 0.013 , and the length of the semi-major axis is 3,393,000 km.; the amplitude of the velocity-variation is 51.8 km., and the period is 9.5 days. The spectrum is of the helium type, but does not show the spectra of both components. Mr. F. C. Jordan finds, from the discussion of sixty-four plates, that the orbit of ζ^1 Lyræ is circular and the period is 4.29991 days; the amplitude of the variation is 102.48 km.

Mr. Jordan has also observed four of the stars in Taurus which Prof. Boss suggested belonged to a group having a common movement. He finds (Publication No. 16) that two of the four stars, Piazzi 234 and Bradley 716, give results in accordance with the idea that they belong to a cluster; the other two, 51 Tauri and ι Tauri, appear to have variable velocities.

THE BOLIDE OF APRIL 20 AS OBSERVED IN FRANCE.—The August number of the *Bulletin de la Société astronomique de France* contains a number of drawings and descriptions (pp. 357-61) of the remarkable meteor seen on April 20 at about 10 p.m. This meteor traversed Ursa Major, leaving behind it a train which lasted for about two minutes as a naked-eye object, according to M. Quénnisset, and could be seen for five minutes with a prismatic binocular. The train moved in an east-and-west direction, and developed a condensation, which is shown by some observers as being at one side of a break in the train, and by others, M. Quénnisset among them, as a bright loop. The brightness of the meteor was about equal to that of Venus at its brightest, whilst that of the train was comparable with the brightness of the Milky Way.

MATERIA MEDICA AMONG THE ZULUS.

IN the July number of the Annals of the Natal Government Museum, Father A. T. Bryant, a competent observer of native life and author of a valuable dictionary of the tribal language, has for the first time collected materials for the study of Zulu materia medica and the methods of the local medicine-man. He records some 240 Zulu plants used in medicine, giving what the people believe to be their properties and the modes in which they are administered to the patient. Here, as among other savage races, the medicine-man was a personage originally distinct from the diviner or so-called witch-doctor; but their functions tend occasionally to overlap, the medicine-man dealing largely in magic and charms, while the witch-doctor makes himself familiar with curative herbs, though his real business is to indicate or "smell out" the agency which is supposed to have caused the illness.

The Kafir medical man has no knowledge of pathology. He knows as much of anatomy as can be learned from cutting up cattle for food; but the nervous system is a complete mystery to him, and though he has observed that the blood runs through the body, he does not associate its circulation with the beating of the heart. He works by the examination of symptoms, though he is ignorant of their cause, treating paraplegia, for instance, by local applications, and not connecting its occurrence with any brain disease. His occasional successes seem to be generally due to the influence of suggestion, by exciting the feeling of confidence or imagination which summons into action the remarkable recuperative powers of the patient. In his profession medicine and magic constitute a single art, and he is called upon to combat, not only the disease which has actually shown itself in the system, but also the machinations and forms of the black art which are believed to have induced it.

Like most savages, the Zulu is unusually susceptible to new diseases, though he is hardened against those which are old. Father Bryant gives interesting details of the more common diseases and their popular treatment. He records a form of disease, believed not to be known to medical science, resulting from an intestinal parasite developing into a species of beetle. The local form of phthisis seems to be different from that of Europe, the former setting in at the bottom, the latter at the top, of the lung. The medicine-man deals largely in blood-letting, poulticing, the use of ointments, the clyster and